

AERATION REQUIREMENTS

As a condition of this Order and as mitigation for the proposed project, the Port of Stockton (Port) shall provide aeration to address the following dissolved oxygen (DO) water quality impacts:

- Immediate effects of dredging
- Long-term effects of increased channel geometry

Immediate Effects of Dredging and Dredge Water Returns

To address the potential localized impacts of the dredging operations on DO, the Port shall provide 500 pounds per day of DO to the water, as close to the dredge as possible without compromising safety.

Long-Term Effects of Increased Channel Geometry¹

As mitigation for the long-term effects of increased channel geometry on the existing DO impairment, the Port shall operate the existing aerator constructed by the United States Army Corps of Engineers (Corps) and/or other aeration, as needed, to provide:

1. During the months of September through November, 2,500 pounds per day of DO, up to a maximum of 227,500 pounds per year whenever background DO concentrations drop below the Basin Plan objective of 6 mg/l.
2. During the months of December through August, 2,500 pounds per day of DO, up to a maximum of 250,000 pounds per year whenever background DO concentrations drop below 5.2 mg/l.

In addition, when the Port is required to provide aeration as specified above, the Port must also:

3. Provide an additional 840 pounds per day of DO, up to a maximum of 84,000 pounds per year, to contribute one-third of the oxygen deficit based on the current level of development.²
4. Provide 750 pounds per day of DO, up to a maximum of 75,000 pounds per year, to mitigate for the additional DWSC volume in the vicinity of the Port of Stockton West Complex dredging project.³

¹ The methodology for measuring ambient DO concentrations (for the purpose of triggering the aeration system) must adequately account for the impact that aerators operated by the Port or others in the vicinity will have on ambient DO conditions.

² The current level of development is based on an assumed daily deficit of 10,000 pounds per day of DO (Jones and Stokes, Aeration Technology Feasibility Report for the San Joaquin River Deep Water Ship Channel, 2004). This aeration requirement may, or may not satisfy future aeration responsibilities assigned to the Port of Stockton as part of future regulatory actions addressing the DO impairment.

³ This 750 pounds per day of DO is based upon an assumed 7.5 % increase in DWSC volume as a result of the proposed dredging of docks 14 through 20. (The average DWSC width of 600 feet is multiplied by the average depth of 25 feet, and multiplied by a length of 1.5 miles from Rough and Ready Island monitoring station to Channel Point, to yield a current estimated DWSC volume of 4.4 million cubic yards. The 326,000 cubic yards of the proposed dredge, divided by 4.4 million cubic yards current volume, indicates an approximate 7.5% increase in channel volume.) This 7.5% increase is applied to an assumed daily deficit of 10,000 pounds per day, to yield 750 pounds per day of DO. These aeration requirements account for the dissolved oxygen mitigation for dredging of all the docks, 14 through 20, at the West Complex.

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The maximum aeration required as a condition for this Order and as mitigation for this project is 4,090 pounds per day, with a maximum annual cap of 636,500 pounds per year, as shown in Table C-1. The quantities shown reflect the rate of oxygen transfer that must be *dissolved* into the water column of the DWSC, not just “bubbled through.” These oxygen input requirements apply over the range of ambient DO conditions (below trigger values) and water quality conditions that exist in the DWSC.

Use of the existing Corps’ aerator, or any other aerator, is contingent upon the Port providing data that demonstrates its effectiveness at dissolving the required amounts of oxygen to the water column. If these requirements are not met, other means of delivering the required oxygen shall be provided and evidence of its effectiveness provided to the Regional Board. See the Provisions of this Order for specific study and reporting requirements.

This mitigation does not release the Port from responsibility to contribute, along with others⁴, to fixing the existing DO impairment. Aeration provided by the Port under the terms of this Order, or in excess of this Order, will be applied towards any future assignment of responsibility. If future assignment of responsibility is less, the aeration requirements of this Order will not be reduced unless this Order is modified or superceded.

The aeration requirements in this Order are based on the most current information to date, which suggests the DO impairment is the result of oxygen deficits of up to approximately 10,000 lbs/day and totaling 1,000,000 lbs/year. The phased DO Control Program adopted by the Regional Board in January 2005 identified increased DWSC geometry as one of three contributing factors to the existing DO impairment. The 3,340 lbs/day (840 lbs/day plus 2,500 lbs/day) of aeration required in this Order is approximately one-third of the assumed daily deficit of 10,000 pounds per day of DO. The 750 lbs/day is based upon an assumed 7.5 % increase in DWSC volume in the vicinity of the proposed dredge projects applied to the assumed daily deficit of 10,000 lbs/day. This accounts for the dissolved oxygen mitigation needed for dredging of all the docks, 14 through 20, at the West Complex. These aeration requirements may, or may not satisfy future aeration responsibilities assigned to the Port of Stockton as part of future revisions to the DO Control Program.

The quantities of aeration in this Order must be provided first, irrespective of the participation to provide aeration by any other entity (e.g. the Port pays for the first incremental part of any aeration provided up to the daily and annual caps described above).

⁴ Additional responsibility for entities responsible for: (1) increased channel geometry; (2) reduced flow and; (3) loads of oxygen demanding substances; may be identified in a future regulatory action by the Regional Board.

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Table C-1 Daily and Annual Aeration Rate Requirements Summary

		Long-term Aeration (pounds per day)					
		Corps Aerator and/or Other aerators as needed					
Aeration items ¹		-1-	-2-	-3-	-4-		
Month	DO Objective (mg/L)	COE	Port of Stockton	Port of Stockton	Port Expansion Mitigation Port of Stockton	Total	
						Daily	Monthly
January	5		2,500	840	750	4,090	126,790
February	5		2,500	840	750	4,090	114,520
March	5		2,500	840	750	4,090	126,790
April	5		2,500	840	750	4,090	122,700
May	5		2,500	840	750	4,090	126,790
June	5		2,500	840	750	4,090	122,700
July	5		2,500	840	750	4,090	126,790
August	5		2,500	840	750	4,090	126,790
September	6	2,500		840	750	4,090	122,700
October	6	2,500		840	750	4,090	126,790
November	6	2,500		840	750	4,090	122,700
December	5		2,500	840	750	4,090	126,790
Annual Cap ² (pounds per year)		227,500	250,000	84,000	75,000	636,500	
Notes:							
1) Aeration items numbered as described earlier for elements of the long-term effects of increased channel geometry 2) Annual cap is based on 100 days times the daily aeration required (except for the COE aeration that is based on 91 days); annual cap is based upon a dissolved oxygen deficit of 10,000 pounds per day or 1,000,000 pounds per year; the actual cap may be higher if daily or annnual deficits are higher; total daily aeration requirements do not sum to the total annual cap							